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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,072	07/15/2003	Chee Wei Wong	MIT.9923	7118
55740	7590	08/31/2005		
GAUTHIER & CONNORS, LLP 225 FRANKLIN STREET BOSTON, MA 02110			EXAMINER KANG, JULIANA K	
			ART UNIT 2874	PAPER NUMBER
DATE MAILED: 08/31/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/620,072	Applicant(s) WONG ET AL.	
	Examiner Juliana K. Kang	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/1/05 (RCE).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. The request filed on July 1, 2005 for a Request for Continued Examination (RCE) under 37 CFR 1.114 is acceptable and a RCE has been established. An action on the RCE follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-12 and 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al (WO 02/10843 A2).

Matsuura et al disclose a photonic bandgap microcavity comprising a deformable membrane structure (support, Matsuura et al show the support structure that changes shape in Fig. 4) that can experience strain (see page 7 lines 2-9); and a photonic bandgap waveguide element formed on said membrane structure having a defect so that when said membrane structure is strained, said photonic bandgap waveguide element is tuned to a selective amount (see page 2 lines 27-30, page 6 lines 16-22, page 7 lines 22-25 and page 9 lines 20-24).

Matsuura et al further disclose that the invention is applied to 1-dimentional, 2-dimentional and 3-dimentional photonic crystals (see page 8 lines 26-30). Matsuura et al further disclose using a bottom electrode and a top electrode to deform the membrane structure to tune the photonic bandgap waveguide using micro-actuators including a piezoelectric actuator (see page 13 lines 27-30, page 15 lines 22-33 and page 19 lines 1-9 and line 15-17).

As described above Matsuura et al disclose the claimed invention except the claimed strain approximately 1% or strain on the membrane between 0.2 and 0.3%. Matsuura et al tuning of photonic crystal by stressing the membrane permits precise control of light traveling through the photonic bandgap waveguide (see page 3 lines 24-27, page 6 lines 1-8, and page 8 lines 26-30). Since Matsuura et al provide the same claimed structure and also teaches tuning of the photonic crystal precisely, it would have been obvious to one having ordinary skill in the art at the time the invention was made to tune the device with any desired tuning including the claimed tuning of approximately 1% or to introduce strain on the membrane between 0.2% and 0.3%, since it has been held that discovering an optimum value of a result effective variable and discovering the optimum or workable ranges involves only routine skill in the art.

4. Claims 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al (WO 02/10843 A2) and further in view of Caracci et al (U.S. Patent 6,445,838 B1).

Matsuura et al disclose using silicon-based substrates that can be physically deformed due to piezoelectric response but does not explicitly teach SiO₂ layer. Silica is well known material used in the art and furthermore Caracci et al that silica is expandable in response to the stimulus of heat or a piezoelectric material which is expandable in response to the stimulus of voltage. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use silicon based substrate such as SiO₂ in Matsuura et al as taught by Caracci et al to tune the waveguide element.

Please note, regarding the method claims above, that method claims parallel article claims exactly without the introduction of any particular manufacturing methods, so that it is proper to examine the article and method claims together.

Response to Arguments

5. Applicant's arguments filed on July 1, 2005 have been fully considered but they are not persuasive. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the deformable membrane structure comprises semiconductor material that do not exhibit piezoelectric effects, attachment of piezoelectric materials to the deformable membrane structure, and deformed membrane is not designed to be permanently disfigured but only strained) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Williams (U.S. Patent 5,313,535) teach deforming piezo-electric material to alter the optical path length of the waveguide.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (571) 272-2348.

The examiner can normally be reached on Mon. & Fri. 10:00-6:00 and Tue. & Thur. 10:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


JULIANA KANG
PRIMARY EXAMINER